ASSAP – WP15-06

RTCA Special Committee 186

Working Group 4

Airborne Surveillance and Separation Assurance Processing

Meeting 15

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Action Item #73 Response

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Response to SC-186 ASSAP WG4 Action Item #73

The referenced action item is as follows: "Investigate the implications of using relative geometric altitude for traffic when pressure altitude is unavailable. Currently the ASA MASPS allows relative altitude for traffic to be calculated by either pressure or geometric altitude."

The issues regarding the intermixing of altitude coordinate systems and altitude data sources are substantial. The use of both pressure and geometric referenced altitude data introduces additional error scenarios if all data is not properly corrected to the same coordinate reference system. GNSS derived altitude and vertical speed data in many cases do not provide equivalent accuracy or integrity as existing pressure referenced data. The ASSAP/CDTI system should not be displaying information to the pilot in a vertical coordinate reference system (geometric) that is different from all other altitude or vertical speed data used by transport avionics systems and currently displayed in the flight deck. The ASSAP/CDTI system should also not be displaying and/or processing altitude data obtained from a different source (GNSS) than other on board systems.

Detailed rationale for response:

The following documents require only the use of pressure referenced altitude measurements (both absolute and relative) as system or operational requirements. Geometric referenced data and/or GNSS derived altitude data are not approved for these systems and/or operations.

1. ICAO Annex 10; Volume IV; Sect. 2.1.3 Transponder reply modes & Sect. 2.1.5 Mode S airborne equipment capability
2. ICAO Document 4444; Procedures for Air Navigation Services; Sect. 13.5.2.6
3. ICAO Document 9574; RVSM Manual; Sect. 4.1.2
4. FAA Document 91-RVSM; Sect. 8.a (1)
5. ARINC 735A; TCAS; Sect. 3.2.1

The MOPS for Airborne Supplemental Navigation Equipment using GPS, DO-208. state in the notes for Table 1-1 "The altitude reference to be used for vertical navigation is barometric altitude not geometric altitude."

The latest version of the WAAS MOPS, DO-229D, acknowledges / states in Appendix N; Section N.1.1, that "the primary altitude sensor in the aircraft is the pressure altimeter".

The WAAS MOPS, DO-229D, in Appendix U, Section U.6 acknowledges that "The equipment is not required to output vertical Figure of Merit, or VPL."

The total loss of pressure altimetry data in transport category aircraft is an extremely improbable event. The ASSAP MOPS does not need to specify a backup mode for these aircraft. Other classes of aircraft will need to provide a controlled source(s) of altitude data that supports the system safety analysis if they are to utilize a CDTI and airborne applications.

Until ICAO modifies the top level guidance and all airborne and ground systems convert to a geometric height reference for altitude measurements and GNSS derived altitude data - the ADS-B system should not operate in isolation from all other airborne and ground systems. This will cause confusion on the flight deck and will decrease system safety levels, not increase them.